

**STUDIES IN EUPHORBIACEAE A.L. JUSS., SENS. LAT. 2\*.  
A REVISION OF *NEOROEPERA* MUELL. ARG. & F. MUELL.  
(OLDFIELDIOIDEAE KÖHLER & WEBSTER, CALETIEAE  
MUELL. ARG.)**

Rodney J.F. Henderson

Queensland Herbarium, Meiers Road, Indooroopilly, Qld 4068, Australia

**Summary**

*Neoroepera* is endemic in central-eastern and north-eastern Queensland, Australia. It contains two species, namely *N. banksii* Benth. and *N. buxifolia* Muell. Arg. & F. Muell. A lectotype is chosen for *N. buxifolia*. Placement of the genus in Caletieae Muell. Arg. rather than Phyllanthaceae Dumort. is justified on grounds of its spinulose pollen and attributes of flowers, fruit and seed. Comments on dates of publication of parts of *Adansonia* 6 (1865-6) are given in Appendix 1.

**Introduction**

The genus *Neoroepera* was established by Johannes (Jean) Mueller (Mueller Argoviensis) and Ferdinand Mueller in the former's contributions on Euphorbiaceae to the de Candolles' great 'Prodromus' (Mueller 1866). It was accepted as containing only one species, *N. buxifolia*, which was based on two specimens collected in central-eastern Queensland by Edward McArthur Bowman (1826-1872) for the latter Mueller, in Melbourne. By 1863, these specimens had reached the de Candolle herbarium in Geneva, Switzerland (G-DC), in time for the former Mueller's study.

Since publication of *Neoroepera* and *N. buxifolia*, only one other species belonging to the genus has been recognised; that was named *N. banksii* and dealt with by Bentham in his 'Flora Australiensis' (1873).

**Origin and author of name *Neoroepera***

The two specimens on which *N. buxifolia* is based are both mounted on the one sheet in G-DC. Duplicates of these collections are in MEL where again they are mounted on the one sheet (MEL 697068). A note by Bowman on that sheet indicates, however, the most likely course of events in relation to his material is as follows. To Mueller, in Melbourne, he sent flowering twigs with both copious male and a few female flowers (but no fruit or seed) from plants he found in central eastern Queensland. Mueller thought these specimens were from a new species of *Flueggea* Willd. so labelled them '*Flueggea buxifolia* F.M.' Later, Bowman sent fruiting and seed material of these plants to Mueller which then convinced him they were from a new species of *Roeperia* Sprengel, or possibly of a new genus (he tentatively named '*Flueggella*'), so annotated them either '*Roeperia buxifolia* J. & F. Mueller' (MEL) or '*Roeperia (oder Flueggella) buxifolia*' (G-DC).

Bowman's note at MEL reads "55./Princhester./I sent this in flower in a former collection." My experience with plants of this species growing in the Marlborough area is that ones copiously flowering do not have many fruit with mature seed at the same time and vice versa. Thus the material on sheets at G-DC and MEL must have been collected on two different occasions as Bowman indicated. Mueller, in his usual fashion, distributed material to Geneva, Paris and to Kew in London, and probably other places too, to assist workers then writing up groups of the Euphorbiaceae. In publishing *Neoroepera*, based on the material in Geneva, Johannes accorded Ferdinand joint authorship, though there is no evidence the latter was involved in selecting the name or preparing the protologue. Indeed, Bentham (1873), working with Kew material, accorded Mueller Argoviensis sole authorship of both the generic and species names and

\*Study number 1, a revision of *Amperea* Adr. Juss., was published in *Australian Systematic Botany* 5: 1-27 (1992).

cited F. Mueller's manuscript '*Roepera buxifolia*' in the synonymy of *N. buxifolia* when dealing with the species. Hutchinson (1969) and Webster (1975) followed Bentham in accepting only Mueller Argoviensis as author of the generic name, but this seems contrary to the latter's wishes. As Johannes Mueller appears responsible for the generic name (he treated *Roeperia* Sprengel as a synonym of *Ricinocarpos* Desf. when publishing *Neoroepera*) and Ferdinand Mueller for the specific epithet, their wishes for joint authorship should be respected.

### History of Classification

When formally describing *Neoroepera* with Ferdinand Mueller, Mueller Argoviensis (1866)<sup>1</sup> grouped the genus with *Hemicyclia* Wight & Arn. and *Cyclostemon* Blume within his subtribe Cyclostemoninae<sup>2</sup> in tribe Phyllanthae Dumort. Though *Cyclostemon* and *Hemicyclia* are now considered congeneric with *Drypetes* Vahl and in the distinct tribe Drypeteae (Griseb.) Hurusawa, Mueller considered *Drypetes* belonged in his subtribe Securineginae ('Securinegeae') within tribe Phyllanthae. To him, this tribe fundamentally contained euphorbs with the lobes of the male perianth imbricate, anthers erect in bud, ovaries with 2-ovulate locules, and cotyledons two or more times wider than the radicle. Subtribe Cyclostemoninae was attributed flowers without petals and commonly in clusters, and with stamens inserted round and from below a central disc. While this gave Mueller a practical, rather simplistic grouping of relevant genera, it failed to take into account several other attributes now considered critical for indicating relationships of the genus *Neoroepera*. Besides, the anthers in *Neoroepera* are transverse on the apex of the filaments, somewhat similar to those in *Micrantheum* Desf. and *Beyeria* Miq. (though held vertical in bud), but not like the erect ones in *Phyllanthus* and its allies.

From Stafleu and Cowan (1976, p. 97), it could be inferred that Baillon (1866) was the first to provide a name for the taxon here treated as genus *Neoroepera* when he described it as section *Neoroepera* of genus *Securinega* Juss. and named its sole species *S. muelleriana*. Though it seems this publication dates from July 1866, the relevant pages of 'Adansonia' probably appeared in September of that year (**Appendix 1**), some weeks after Mueller's publication. Thus, his *Sauropus* sect. *Neoroepera* is a new combination of the Muellers' *Neoroepera*, and his *S. muelleriana* is an illegitimate name (Greuter *et al.* 1988) provided for Bowman's Princhester Creek specimens.

Bentham (1873) maintained *Neoroepera*, on the basis of flowers of both sexes with a perianth, embryo with broad cotyledons and a narrow radicle, and two ovules in each ovary locule, in tribe Phyllanthae but did not recognise subtribes within that. He later (Bentham 1883) maintained *Neoroepera* within Phyllanthae but there associated it with several genera such as *Phyllanthus* L. (in a very broad sense), *Sauropus* Blume and *Securinega* Juss., none of which is now considered closely related to it.

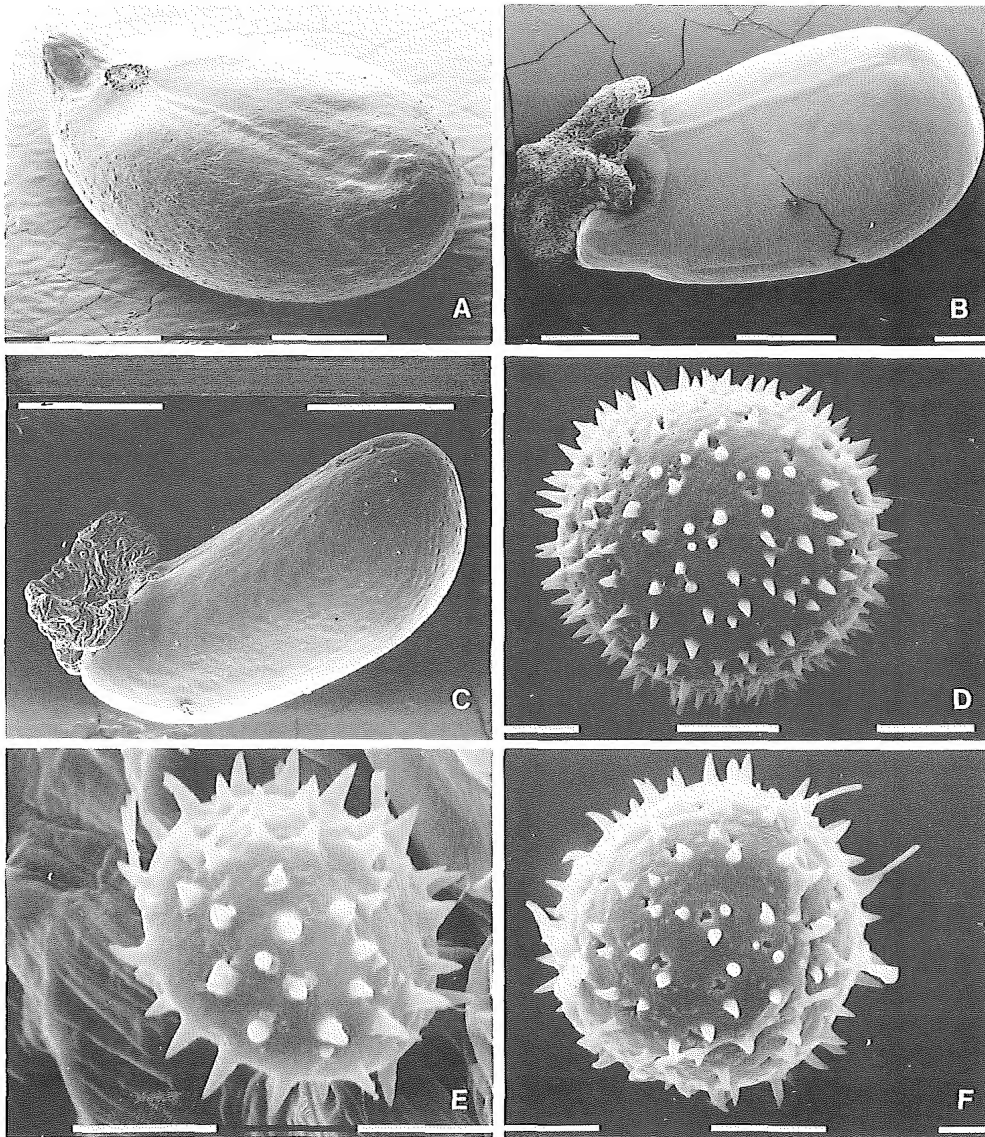
The association of *Neoroepera* with *Phyllanthus* and its allies in the Phyllanthae persisted apparently until Hutchinson (1969) segregated it into the Drypeteae (Pax) Hutchinson (correctly Drypeteae (Griseb.) Hurusawa according to Webster 1975). As Hurusawa (1954) did not name *Neoroepera* anywhere in his account of the Euphorbiaceae, it is not clear where he intended it to be placed though presumably it remained within tribe Phyllanthae and covered by the 'etc.' in his list of genera included in that tribe. Hutchinson's segregation was prompted, no doubt, by Pax's inclusion of *Neoroepera* in subtribe Drypetinae of Phyllanthae in 1890 (Pax & Hoffman 1931) based, seemingly, principally on the disc in male flowers in *Neoroepera* being central. This genus invariably has carunculate seeds and *N. banksii* is a dioecious species. Pax apparently did not know that pollen of *Neoroepera* is spiny, fundamentally different from the non-spiny pollen of *Drypetes*. Thus this genus' association with *Drypetes*, persisting from 1866 when the Muellers first described it, was perpetuated by Hutchinson even though he dissociated it from *Phyllanthus*.

With his different approach to classification within Euphorbiaceae, Webster assessed more than the traditional attributes used to divide the family and produced a new

<sup>1</sup> Published in late August 1866 according to Stafleu & Cowan 1976, p. 447.

<sup>2</sup> 'Cyclostemoneae' Muell. Arg. (1865), equivalent to 'Cyclostémonées' of Baillon (1858).

classification of it (Webster 1975) based primarily on ovule numbers per ovary locule, morphology of pollen and other data from such fields as wood anatomy, cytology and biochemistry. Thus, based on the paired ovules in each ovary cell, the spiny pollen and carunculate seed, Webster grouped *Neoroepera* with *Micrantheum* Desf., *Pseudanthus* Sprengel and *Stachystemon* Planchon in Caletieae within sub-family Oldfieldioideae, totally dissociating it from *Phyllanthus* and *Drypetes* which he retained in subfamily Phyllanthoideae. Webster later admitted (1987) that his classification is by no means definitive or wholly satisfactory, for much information to test the robustness of his scheme is lacking. However, in the case of *Neoroepera* it seems logical to associate it with at least *Micrantheum* wherever that is placed, because, besides sharing the attributes



**Fig. 1.** Scanning electron micrographs of *Neoroepera* and *Micrantheum* pollen and seed: A. seed of *N. buxifolia*. B. seed of *N. banksii*. C. seed of *M. ericoides*. D. pollen grain of *M. hexandrum*. E. pollen grain of *N. banksii*. F. pollen grain of *N. buxifolia*. A, Bowman 55, MEL; B, Staples 2213, BRI; C, SW slopes of Mt Coolum, Qld, Nov 1987, Henderson H 3111, BRI; D, Prosser River, Tas, Sep 1972, Jarman [AQ380673], BRI; E, Scarth-Johnson 1459A, BRI; F, Anderson 2361, BRI. Scale bar A-C = 1 mm, D-F = 10  $\mu$ m.

of two ovules per locule, spiny pollen (Fig. 1), and carunculate seed (Fig. 1) with that genus, it has a petaloid, single-whorled perianth, bilocular anthers transverse on the filaments, a central, gland-like disc lobed between the stamen filaments in male flowers, styles that are entire (though somewhat dorsi-ventrally expanded rather than more or less terete), and seeds somewhat tumid proximally about the hilum (at least in *N. banksii*) as do *Micranthemum* species. Thus, Webster's transfer of *Neoroopera* to Caletieae seems fully justified and is accepted here.

This close relationship of *Neoroopera* with *Micranthemum* was noticed by F. Mueller who annotated a Walter specimen of *N. banksii* from Lizard Island in 1871 (MEL 697066) as '*Neoroopera micrantheoides*' and commented that the plant was "similis *Micranthemum hexandrum*", though he (? later) incorrectly accepted that the plants represented *N. buxifolia* 'J. M. & F. M.'.

Whether or not the Oldfieldioideae warrants family status (as Paivauesaceae) as suggested by Meeuse (1990), will have to wait till a more detailed study of the Euphorbiaceae *sens. lat.* is undertaken.

### Origin of central structure in male flowers

The finding of a flower with a pistilode in a specimen of male *N. banksii* (Gittins 1833, in BRI and NSW), an attribute that occasionally occurs in the family (Baillon 1858; Webster 1984) but not to my knowledge recorded for *Neoroopera* before, helps clarify the nature of the central structure in male flowers. In this particular flower, the ovary, complete with three typical styles and stigmas but with the ovules abortive, arises from the centre of a gland-like, lobed structure otherwise typical of male flowers of this genus, that is, internal to the stamens and lobed with the lobes protruding between the filaments. Thus, the central structure found in male flowers of *Neoroopera* is homologous with the disc that subtends the ovary in female flowers and as such confirms traditional thought that it is a disc internal to the stamens, not a vestigial gynoeceum as suggested by Baillon (1866).

### Taxonomy

**Neoroopera** Muell. Arg. & F. Muell. in DC., Prodrum 15(2): 488 (August 1866); *Securinea* section *Neoroopera* (Muell. Arg. & F. Muell.) Baillon, Adansonia 6: 333 (September 1866). **Type:** *N. buxifolia* Muell. Arg. & F. Muell.

**Derivation of name:** Named from Greek *neos*, new, and '*Roopera*' after the generic name *Roeparia* Sprengel (a later synonym of *Ricinocarpos* Desf. also in the Euphorbiaceae) which honours Johann August Christian Roeper, German botanist, who, in the 1860s, was a professor at Basel (then Rostock) and who published on the Euphorbiaceae of Germany and Hungary (Baines 1981).

Shrubby monoecious or dioecious perennials with stems erect or ascending, branching, the branches leafy throughout. Leaves alternate, stipulate, shortly petiolate, persistent or caducous. Stipules entire. Flowers pedicellate, solitary or paired or in clusters or short spikes (reduced branchlets) in leaf axils, subtended by minute bracts; perianth lacking a corolla, petaloid, of several imbricate lobes; lobes dimorphic, usually a small sepal-like one alternating with a larger, petal-like one,  $\pm$  free. Male flowers 6 (rarely 4, 5, 7 or 8)-merous; perianth lobes entire, emarginate, ciliate or shortly erose; a whorl of few to many, discrete, finger-like glands present between tepals and stamens; stamens exserted; anthers of two, separate, obloid, parallel but contiguous locules each transverse on the apex of a reduced lobe of the shortly bifid filament, dehiscing by longitudinal slits; disc a central, squat,  $\pm$  sessile, lobed structure embracing base of filaments. Female flowers 6(-8)-merous; perianth persistent, of  $\pm$  distinct, imbricate lobes; lobes appressed to ovary but spreading in fruit, entire or somewhat ciliate or erose on upper margins; glands in two whorls, the outer of few, discrete finger-like lobes, the inner of discrete, flattened, irregular lobes on a continuous rim. Ovary 3 (rarely 4)-celled with two pendant ovules from an enlarged placenta in each locule; styles 3 (rarely 4),  $\pm$  free from the base, sulcate adaxially, horizontally spreading at first but becoming erect or ascending with age, entire, the distal portion expanded and dorsi-ventrally flattened into a large stigmatic zone.





Fig. 2. *Neoroepera banksii*: A. apical portion of stem from male plant showing axillary flower clusters  $\times 2$ . B. male flower  $\times 6$ . C. apical portion of stem with long narrow leaves, from female plant  $\times 2$ . D. female flower from side showing solitary pedicel, perianth lobes and bracts  $\times 4$ . E. ovary from above showing styles and distally flattened, broad, stigmatic portions  $\times 8$ . F. sub-mature fruit viewed from the side showing pedicel and persistent styles and perianth  $\times 2$ . G. apex of stem with short broad leaves  $\times 2$ . A,B, Gittins 1833; C-E, Ross [AQ473929]; F, Scarth-Johnson 1271A; G, Isbell [AQ204124]. All BRI.

Fruit capsular, separating septicidally into three 2-valved cocci. Seeds somewhat curved, becoming dorsio-ventrally flattened at maturity, smooth or minutely pitted, carunculate, pale to dark brown when mature (and containing embryo); caruncle whitish to reddish, waxy-fleshy; endosperm copious; cotyledons several times broader than the radicle.

A genus of 2 species endemic in tropical eastern Australia.

### Key to species of *Neoroepera*

1. Plants dioecious; leaves broadest above the middle; perianth lobes of male flowers virtually smooth on margins; stamen filaments spreading hairy to above the middle; stigma limb much wider than long; far north Queensland . . . . . **1. *N. banksii***
- Plants monoecious; leaves broadest at or below the middle; perianth lobes of male flowers ciliate on margins; stamen filaments glabrous, smooth or sparsely papillose proximally; stigma limb  $\pm$  longer than wide; central Queensland . . . . . **2. *N. buxifolia***

**1. *Neoroepera banksii* Benth.**, Flora Australiensis 6: 117 (1873). **Type:** Queensland, sandy ridges, north shore, Endeavour River, *A. Cunningham* (holo: ?K *n.v.*; iso: MEL).

Dioecious shrubs (0.15–)0.5–2 m high. Stems smooth, rounded, shortly spreading-hairy when young, later glabrescent. Leaves evenly spaced along stems and branches, spreading; petiole 1.0–1.2 mm long, shortly curved hairy adaxially and abaxially; blade oblanceolate to very narrowly obovate or  $\pm$  spatulate, broadly obtuse or emarginate at tip and shortly attenuate to base, 6–16 mm long, 1.0–6.8 mm wide, smooth except for raised nervation, and glabrous except for short curved hairs proximally on midrib and around recurving tip above, smooth and glabrous below; midrib produced as a short, recurving, usually reddish subula from the emarginate tip; margins entire, a little thickened and recurving. Stipules dark red at least distally, narrowly triangular with tip acute, 0.3–1.0 mm long and to c. 0.3 mm wide; margins glabrous to densely hairy. Flowers single or in few-flowered clusters, subtended by numerous bracts similar to but smaller than stipules. Male flowers solitary or in pairs or threes, shortly pedicellate, 6–8-merous; pedicels 6.0–9.5 mm long in flower to c. 18.0 mm long in fruit. Perianth spreading; lobes ovate to obovate with tips rounded and entire or erose, and margins entire or few toothed, sepal-like ones 0.8–1.3 mm long and 0.6–0.8 mm wide, somewhat concave, the petal-like ones 2.0–2.3 mm long and 1.7–1.9 mm wide, dishd; glands of the outer whorl to c. 0.15 mm long. Stamens 6–8; filaments stout, 1.9–2.4 mm long, spreading long hairy in the lower three quarters; anthers 0.85–1.00 mm long; glandular disc c. 0.9 mm across and 0.3 mm high; pistilode rarely present. Female flowers solitary, pedicellate; pedicels 9–15(–25) mm long in flower, to c. 30 mm long in fruit. Perianth spreading, persistent and reflexed beneath fruit; lobes semi-elliptic to oblong to obovate, with margins entire, the sepal-like ones 1.4–2.4 mm long and 0.8–1.3 mm across and rounded or acute at the apex, smooth or ciliate on margins, the petal-like ones 2.5–3.4 mm long and 1.2–1.6 mm across, and cucullate acute at the apex, smooth or ciliate distally on margins; glands of the inner disc forming a continuous, flattened, 3-lobed ring at base of the ovary, the lobes  $\pm$  triangular and to c. 0.7 mm long. Ovary ovoid, c. 1.5 mm high and 1.75 mm across; styles stout, with column 0.5–0.7 mm long, and flattened limb  $\pm$  reniform in outline, c. 1.6–2.2 mm across. Fruit ovoid, to c. 6.5 mm long, at first conspicuously crowned with the 3 (or 4) long-persisting styles, reddish green when mature. Seed  $\pm$  obloid, a little tumid proximally (around hilum), 4.0–4.7  $\times$  2.2–2.7  $\times$  2.2–2.7 mm, longitudinally striate with lines of minute fovea, later smooth; caruncle irregularly shaped and  $\pm$  coralloid (dried state). **Figs 1, 2.**

**Selected specimens** (63 examined): **Queensland.** COOK DISTRICT: 5 km NE of Bamaga airstrip, Aug 1978, *Paijmans* 3020 (♀) (BRI,CANB); 11°35'S, 142°27'E, vicinity of McDonnell, Jul 1970, *Isbell* [AQ204125] (♀) (BRI); ditto, *Isbell* 14 (sterile) (BRI); 11°36'S, 142°46'E, between Heathlands homestead and Captain Billy beach, May 1980, *Morton* 638 (♀) (BRI,MEL); 12°07'S, 143°05'E, Olive River, near mouth, Sep 1974, *Tracey* 14494 (♀) (BRI); c. 34 km from 'Bromley' along road to Bolt Head, 11 km from Olive River crossing turnoff, Jul 1990, *Ross* [AQ473929] (♀) (BRI); 14°08'S, 143°21'E, c. 48 miles [77 km] N of Musgrave Telegraph Station, *Gittins* 1833 (♂) (BRI) (♂ & ♀) (NSW); Lizard Island, in 1871, *Walter* (MEL); ditto, May 1975, *Byrnes* 3146 a(♀) & b(♂) (BRI); ditto, Jul 1990, *Batianoff* 12186 (♀) (BRI); Hopevale, Jul 1977, *Scarsh-Johnson* 545A (♀) (BRI); 15°17'S, 145°19'E, 3 km SW of South Cape Bedford, Aug 1978, *Kanis* 1928 (♀) (BRI,CANB); Cooktown, mouth of Endeavour River, Jun-Aug

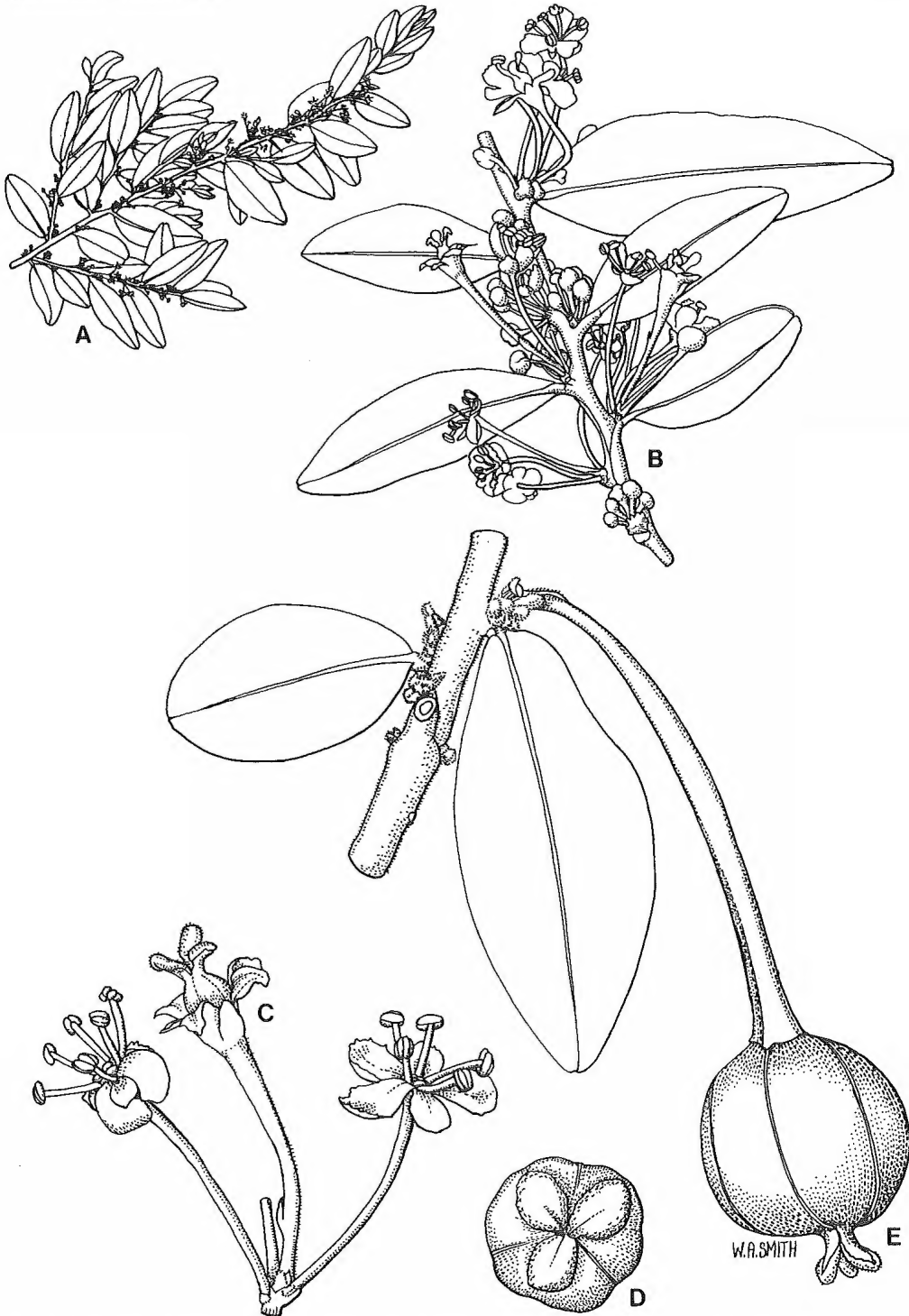


Fig. 3. *Neoroepera buxifolia*: A. apical portion of a flowering branch  $\times 0.33$ . B. portion of a twig showing clusters of male and female flowers  $\times 2$ . C. partial cluster of flowers showing central female and surrounding male flowers - note 5- and 6-merous male flowers  $\times 4$ . D. ovary from above showing styles with distal, flattened, stigmatic portions  $\times 8$ . E. portion of a stem showing sub-mature fruit with persistent styles  $\times 4$ . A-E, Batianoff MC9108001 & Robins, BRI.

1770, *Banks & Solander* [AQ450766/MEL 515923] (♀) (BRI,MEL); ditto, May 1970, *Blake* 23311 (♀ & ♂) (BRI,MEL); 15°34'S, 147°34'E, approximately 1 km S of Annan River mouth, Aug 1974, *Tracey* 14734 (♀) (BRI,MEL,QRS).

**Distribution and habitat:** Confined to far north-eastern Queensland north of about Cooktown (**Map 1**). Commonly occurs in sandy soils on or close to the coast, in dune communities or *Eucalyptus* forest on the landward side of coastal sand-dunes.

**Notes:** The variability in leaf shape suggests that at least two infraspecific taxa can be recognised so distinctive are the extremes. The most northerly material generally has remarkably small, narrow leaves, e.g. *Isbell* [AQ204125], whereas that from around Cooktown mostly has comparatively longer, quite broad leaves, e.g. *Kanis* 1928. However, since small-leaved forms can also occur near Cooktown, e.g. *Scarath-Johnson* 545A, and broader leaved ones near Cape York, e.g. *Isbell* 14 (**Fig. 2G**), and forms that cannot be grouped with either the above with certainty, e.g. *Tracey* 14494, occur throughout the species' range, no attempt has been made to formally recognise this variability. The MEL isotype has leaves within the range of small/narrow to large/broad somewhat closer to the large than small end of the range. There seems no qualitative differences between leaves of the different forms.

Notes accompanying *Batianoff* 12186 indicate this species has horticultural potential as it is in cultivation on Lizard Island where it is described as a spectacular ornamental because of its striking red mature fruits.

**Risk coding:** This species is evenly distributed throughout its range and can be classed as common. It is conserved in at least the Lizard Island National Park and is not at risk.

2. *Neoroepera buxifolia* Muell. Arg. & F. Muell. in DC., *Prodromus* 15 (2): 489 (August 1866). **Type:** In New Holland at 'Prenchestic' [= Princhester] Creek [Queensland], *Bowman* (lecto chosen here: G-DC *n.v.* [BRI-microfiche IDC 800-74. 2508: I, 2], twig bearing male and (?)female flowers; isolecto: MEL).

*Securinega muelleriana* Baillon, *Adansonia* 6: 333 (September 1866), *nom. illeg.*  
Based on *Neoroepera buxifolia* Muell. Arg. & F. Muell.

Monoecious shrubs or small trees to c. 6 m high. Stems smooth, at first shortly antrorsely ferruginous pubescent later glabrescent, rounded, robust, many-branched with branches spreading or ascending. Leaves evenly spaced along stems; petiole 1.0–2.0 mm long; blade narrowly to broadly ovate to elliptic (or occasionally orbicular), with margins slightly thickened and a little recurving, tapered to broadly obtuse and a little emarginate tip and also to base, 10.0–40.0 mm long, 6.5–20.0 mm wide, smooth above and below; midrib produced as a spreading, microscopic subula from the emarginate tip; margins entire, smooth. Stipules subulate, to c. 0.3 mm long, glabrous, reddish, caducous. Flowers clustered along short axis, subtended by numerous microscopic, semi-circular to triangular, externally appressed-hairy bracts. Male flowers several in each cluster, pedicellate, (4, 5 or) 6 (or 7)-merous; pedicels 4.5–8.0 mm long. Perianth ± crateriform; lobes ovate to obovate with tips rounded and entire, emarginate or erose, and margins regularly ciliate, sepal-like ones 0.75–1.8 mm long and 0.65–1.2 mm wide, somewhat cupular, the petal-like ones 2.2–3.2 mm long and 1.5–2.5 mm wide, dishd; disc of many, spreading filiform, entire or bifid or secondarily lobed lobes up to 1.5 mm long. Stamens (4, 5 or) 6 (or 7); filaments straight, glabrous, smooth or sparsely papillate, 1.7–3.6 mm long, incipiently bifid distally; anthers ellipsoidal, 0.7–1.2 mm long. Female flowers solitary, apical on a short axis with several male flowers below it, pedicellate; pedicels to c. 8.5 mm long in flower, to c. 18 mm long in fruit, stouter than that of males, shortly antrorsely hairy throughout but denser distally, glabrescent, bracteolate near or below middle; bracteoles ± ovate, to c. 0.5 mm long. Perianth ± crateriform, persistent and somewhat reflexed beneath fruit; lobes narrowly ovate to oblong, rounded at the apex, and with margins shortly ciliate, the sepal-like ones 1.2–1.5 mm long, 0.75–1.1 mm across, the petal-like ones 2.5–2.8 mm long and 1.7–1.9 mm across. Ovary ± ovoid, to c. 1.5 mm long; styles stout, adnate only near base, ascending, with column c. 0.5 mm long, and flattened limb ± narrowly ovate in outline, c. 1 mm long, its margins revolute. Fruit obloid to obovoid, 5–8 mm long, at first conspicuously crowned with the 3 long-persisting styles, olive green (?) at maturity. Seed ± obloid to ovoid becoming dorsiven-

trally flattened with maturity,  $4.2\text{--}5.1 \times 2.1\text{--}3.3 \times 1.7\text{--}2.3$  mm, smooth but with contiguous minute fovea visible below surface of testa; caruncle reduced to a small, red-coloured flap or cone-shaped outgrowth of tissue from testa that abutted the hook-like placenta. Figs 1, 3.

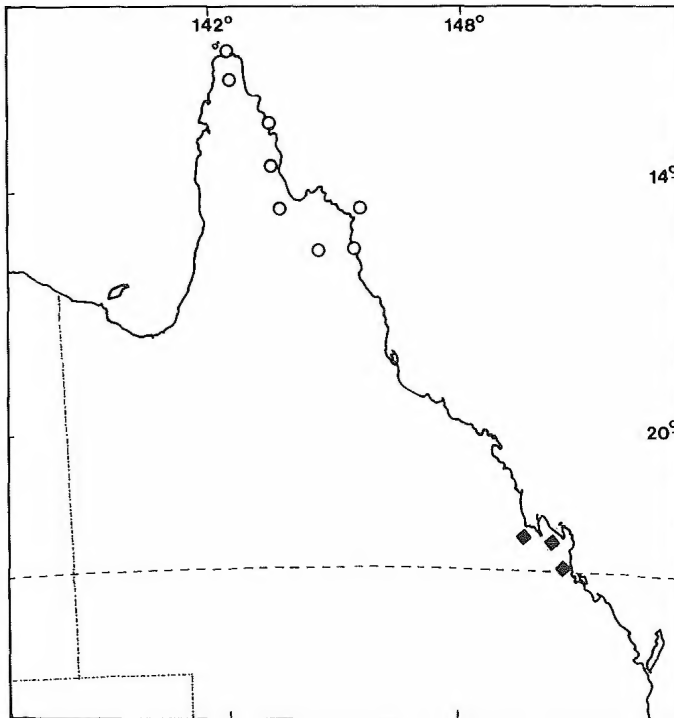
**Specimens examined:** Queensland. PORT CURTIS DISTRICT: between Marlborough and Yaamba, Oct 1937, *White* 12095 (BRI); Livingstone Shire, about 11 km S of Marlborough homestead, at Marlborough Creek crossing, Nov 1981, *Anderson* 2361 (BRI);  $22^{\circ}58'S$ ,  $149^{\circ}52'E$ , Marlborough Creek Crossing, Mar 1989, *Reeves* 630 (BRI); ditto, May 1991, *Batianoff & Franks* (BRI);  $23^{\circ}04'S$ ,  $150^{\circ}15'E$ , just W of Canoona, c. 45 km NW of Rockhampton, on road to Mona Vale, Nov 1990. *Henderson* H3490 & *Robins* (BRI,K,MEL,NSW)

**Distribution and habitat:** Known only from a few creek-side localities north-west of Rockhampton in the Port Curtis pastoral district, in areas of serpentinite soils (**Map 1**).

**Notes:** As explained above, the sheet of type material at G-DC, as well as that at MEL, contains material of *Neoroepera buxifolia* collected on two different occasions. Thus each of the two specimens on the G-DC sheet is a syntype while those at MEL are isosyntypes. To be sure of the application of the name, Bowman's flowering specimen at G-DC, as opposed to the fruiting material there, is selected as its lectotype.

The duplicate material distributed to K was cited by Bentham (1873). That loaned to Baillon in Paris was obviously examined and reported on to Mueller prior to Baillon's publication of 1866, for annotation on the MEL sheet reads '*Securinega muellerii* Baill'. That name was not published but *Securinega muelleriana* was. However, as it was proposed as a later alternative for *Neoroepera buxifolia* it is not a legitimate name.

This species appears restricted to the bed and banks of creeks in areas of outcropping ultramafic (serpentine) rock which itself is, in central Queensland, restricted largely to the Yaamba to Marlborough area, with a second, though somewhat smaller, occurrence between Rockhampton and Yeppoon. Thus the species could be expected to be found at other creek-side situations where serpentinite soils occur in this area.



**Map 1.** Distribution of *Neoroepera* species: ○ *N. banksii*. ◆ *N. buxifolia*.



**Risk coding:** Though this plant is quite common in the riparian habitat it is confined to, it is restricted in occurrence at any one site. None of the known sites of occurrence is within any declared conservation reserve though the plant is known to occur within one State Forest. Most sites are subject to roadside clearing and/or grazing, and none of them is more than 50 km from the others. The species must, therefore, be considered vulnerable. A risk coding of 2V, as recorded by Briggs and Leigh (1988), is thus still appropriate.

### Acknowledgements

The Directors of MEL and NSW are thanked for loan of their holdings of *Neoroepera* (including types from MEL) to BRI for study. I am grateful to Will Smith for producing the illustrations and maps, and to Andrew Franks and Hans Dillewaard for the SEM photomicrographs. George Batianoff, Paul Robins and Andrew Franks collected pickled material of *N. buxifolia* for me for illustration purposes. Support by grants from the Australian Biological Resources Study (ABRS) for my 'Stenolobea' studies since 1988 is gratefully acknowledged.

### References

- BAILLON, H.E. (1858). Étude générale du groupe des Euphorbiacées p. 561. Paris: Victor Masson.
- BAILLON, H.E. (1866). Species Euphorbiacearum Euphorbiacées Australiennes. *Adansonia* 6: 282-345.
- BAINES, J.A. (1981). Australian Plant Genera. Society for Growing Australian Plants.
- BENTHAM, G. (1873). *Neoroepera*. *Flora Australiensis* 6: 116-117. London: L. Reeve.
- BENTHAM, G. (1883). Euphorbiaceae. In G. Bentham & J.D. Hooker, *Genera Plantarum* 3: 239-340. London: L. Reeve.
- BRIGGS, J.D. & LEIGH, J.H. (1988). Rare or Threatened Australian Plants. 1988 Revised Edition. Australian National Parks and Wildlife Service Special Publication [14]. Canberra: Australian National Parks and Wildlife Service.
- GREUTER, W. ET AL. (1988). International Code of Botanical Nomenclature. Articles 62.1, 63.1 & 63.2. *Regnum Vegetabile* 119: 63 & 64.
- HURUSAWA, I. (1954). Eine nochmalige Durchsicht des herkömmlichen Systems der Euphorbiaceen im weiteren Sinne. *Journal of the Faculty of Science University of Tokyo Section III Botany* 6: 209-344.
- HUTCHINSON, J. (1969). Tribalism in the family Euphorbiaceae. *American Journal of Botany* 56(7): 738-758.
- MEEUSE, A.D.J. (1990). The Euphorbiaceae *auct. plur.*, an Unnatural Taxon. Delft: Eburon.
- MUELLER, J. (1865). Euphorbiaceae. Vorläufige Mitteilungen aus dem für De Candolle's Prodrömus bestimten Manuscript über diese Familie. *Linnaea* 34: 64.
- MUELLER, J. (1866). Euphorbiaceae. In A.L.P.P. de Candolle (ed.), *Prodrömus Systematis Naturalis Regni Vegetabilis* 15(2): 189-1260. Paris: Masson.
- PAX, F. & HOFFMAN, K. (1931). Euphorbiaceae. In A. Engler & K. Prantl (eds), *Die Natürlichen Pflanzenfamilien* Band 19c: 11-233.
- STAFLEU, F.A. & COWAN, R.S. (1976). Taxonomic Literature edn 2. 1(A-G): 97, 447. *Regnum Vegetabile* 94.
- WEBSTER, G.L. (1975). Conspectus of a new classification of the Euphorbiaceae. *Taxon* 24: 593-601.
- WEBSTER, G.L. (1984). A revision of *Flueggea* (Euphorbiaceae). *Allertonia* 3(4): 259-312.
- WEBSTER, G.L. (1987). The saga of the spurges: a review of the classification and relationships in the Euphorbiales. *Botanical Journal of the Linnean Society* 94: 3-46.

### Appendix 1

It is reasonable to assume from Stafleu and Cowan (1976) that Baillon's publication dealing with *Neoroepera* in *Adansonia* appeared in July 1866, before that of Mueller Argoviensis. However, Dr Grady Webster (pers. comm.) has pointed out that since Baillon cited actual page numbers in his reference to de Candolle's Prodrömus under *Securinega muelleriana*, and considering the personal relationship between Mueller and himself, it is likely his publication appeared after Mueller's (late August 1866).

Despite what may be inferred from the title page and from Stafleu and Cowan, it seems clear that for Volume 6 of 'Adansonia', the publication schedule slipped beyond August 1866. Though parts comprised of 32 pages may have appeared monthly in early volumes, it is clear that the journal was produced in fascicles of 16 pages which were numbered consecutively in each volume in the bottom right-hand corner of the first page of that fascicle, and did not necessarily appear two per month. In Volume 6, though fascicles 1 to 11 are undated, fascicles 12 to 24 carry a date (presumably of publication) in the bottom left-hand corner as follows.

Fascicle	Pages	Date	Fascicle	Pages	Date
12	177-192	07 Oct 1865	19	289-304	30 Aug 1866
13	193-208	11 Mar 1866	20	305-320	Sep 1866
14	209-224	11 Mar 1866	21	321-336	Sep 1866
15	225-240	18 May 1866	22	337-352	Sep 1866
16	241-256	12 Jun 1866	23	353-368	Oct 1866
17	257-272	12 Jul 1866	24	369-384	Oct 1866
18	273-288	30 Jul 1866			

Thus fascicles 18 to 22 of this volume, covering Baillon's paper on Australian euphorbs, apparently appeared over two months with the critical fascicle (number 21) appearing in (probably) mid to late September 1866, indeed later than Mueller's. Incidentally, though Volume 7 fascicle 1 is undated, Volume 7 fascicle 2 is also dated September 1866.

Accepted for publication 17 March 1992